

Claims

[c1] 1. A stacked thermocouple structure comprising:

- a plurality of first conductors on a surface and formed of a first material, each of the first conductors having first and second ends and a thickness in a direction normal to the surface;
- a dielectric layer on each of the first conductors;
- a plurality of second conductors on the dielectric layer and formed of a second material that differs from the first material, each of the second conductors having a thickness in a direction normal to the surface, a first end overlying and contacting the first end of the corresponding first conductor, and a second end overlying but separated from the second end of the corresponding first conductor by the dielectric layer; and
- a plurality of third conductors, each of the third conductors electrically interconnecting the second end of one of the second conductors with the second end of one of the first conductors other than the first conductor on which the second conductor lies, each of the third conductors having a thickness in a direction normal to the surface that is greater than the thickness of the second conductors.

- [c2] 2. The stacked thermocouple structure according to claim 1, wherein the third conductors are formed of the second material.
- [c3] 3. The stacked thermocouple structure according to claim 1, wherein the dielectric layer has a thickness in a direction normal to the surface that is less than the thicknesses of the second conductors.
- [c4] 4. The stacked thermocouple structure according to claim 1, wherein the thicknesses of the third conductors are more than three times greater than the thicknesses of the second conductors.
- [c5] 5. The stacked thermocouple structure according to claim 1, wherein the third conductors and the second ends of the first and second conductors define cold junctions of the stacked thermocouple structure.
- [c6] 6. The stacked thermocouple structure according to claim 1, wherein the first material is polysilicon and the second material is aluminum
- [c7] 7. The stacked thermocouple structure according to claim 1, wherein the first and second conductors define steps that are traversed by the third conductors.
- [c8] 8. The stacked thermocouple structure according to

claim 1, wherein the surface is defined by a second dielectric layer on a substrate and each of the first conductors is on the second dielectric layer.

- [c9] 9. The stacked thermocouple structure according to claim 8, wherein the second conductors have lateral widths less than lateral widths of the first conductors so as to define steps from the substrate to the second conductors, the steps being traversed by the third conductors.
- [c10] 10. The stacked thermocouple structure according to claim 1, wherein the stacked thermocouple structure is a thermopile that produces an output dependent on a temperature difference between the first and second ends of the first and second conductors.
- [c11] 11. The stacked thermocouple structure according to claim 10, wherein the thermopile is a component of a thermal sensor package.
- [c12] 12. A stacked thermocouple structure of a thermopile that produces an output dependent on a temperature difference between hot and cold junctions of the thermopile, the stacked thermocouple structure comprising: a plurality of first conductors on a surface and formed of a first material, each of the first conductors having first

and second ends and a thickness in a direction normal to the surface; a dielectric layer on each of the first conductors; a plurality of second conductors on the dielectric layer and formed of a second material that differs from the first material, each of the second conductors having a thickness in a direction normal to the surface, a first end overlying and contacting the first end of the corresponding first conductor to define one of the hot junctions of the thermopile, and a second end overlying but separated from the second end of the corresponding first conductor by the dielectric layer; and a plurality of third conductors formed of the second material, each of the third conductors electrically interconnecting one of the second ends of the second conductors with one of the second ends of the first conductors to define one of the cold junctions of the thermopile, each of the third conductors having a thickness in a direction normal to the surface that is greater than the thickness of the second conductors.

[c13] 13. The stacked thermocouple structure according to claim 12, wherein the dielectric layer has a thickness in a direction normal to the surface that is less than the thicknesses of the second conductors.

- [c14] 14. The stacked thermocouple structure according to claim 12, wherein the thicknesses of the third conductors are more than three times greater than the thicknesses of the second conductors.
- [c15] 15. The stacked thermocouple structure according to claim 12, wherein the first material is polysilicon and the second material is aluminum.
- [c16] 16. The stacked thermocouple structure according to claim 12, wherein the thermopile is a component of a thermal sensor package.
- [c17] 17. The stacked thermocouple structure according to claim 12, wherein the first and second conductors define steps that are traversed by the third conductors.
- [c18] 18. The stacked thermocouple structure according to claim 12, wherein the surface is defined by a second dielectric layer on a substrate and each of the first conductors is on the second dielectric layer
- [c19] 19. The stacked thermocouple structure according to claim 18, wherein the second conductors have lateral widths less than lateral widths of the first conductors so as to define steps from the substrate to the second conductors, the steps being traversed by the third conductors.

[c20] 20. The stacked thermocouple structure according to claim 12, wherein the thermopile is a component of a thermal sensor package.